

A DEVICE FOR COLLECTING WASTE

FIELD OF THE INVENTION

The present invention relates to a device for collecting waste, the device comprising a receptacle in which a plastics bin liner bag is placed.

More particularly, the present invention relates to a device for collecting or packaging waste seeking to facilitate and simplify the operations of collecting and packaging waste whether for home or professional use, and more particularly seeking to improve comfort and hygiene of such use.

More precisely, the present invention relates to a device for collecting waste, which device comprises a receptacle in which a plastics bin liner bag is placed, and further comprises:

• a storage compartment for storing a covering in the form of a sheath or sock for forming a bag and made of a plastics film, said covering being contained in a storage compartment, preferably in folded form, said compartment being situated in the top portion of said receptacle, preferably inside it;

• drive means suitable for delivering said covering from said storage compartment inside of said receptacle to form said bag, preferably down to the bottom of said receptacle;

• seal and cutter means, preferably operating by heat-sealing and hot-cutting, for sealing and cutting said covering, enabling a said bag to be made from said covering leaving said compartment, and subsequently enabling a said bag to be closed and separated from the remainder of said covering once the bag has been filled with waste; and

• said storage compartment being disposed in such a manner as to define a top central orifice of said receptacle through which waste can be introduced into said bag.

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BACKGROUND OF THE INVENTION

US patent No. 6 065 272 describes a waste collector device of that type in which the drive means are rotary rollers placed against each other in the center region of 5 the receptacle on a permanent basis. Said rollers press continuously against the plastics sheath delivered from the top storage compartment. When waste is dropped in from above the receptacle, said rollers move apart from each other to allow the waste to pass, but continue to 10 exert pressure against the sheath and the waste, thereby causing both the sheath and the waste to be entrained together. The constant pressure from the rollers on the sheath enables the receptacle to be continuously confined. Entraining the waste into the inside of the 15 receptacle is necessarily associated with sheath material being delivered from its storage compartment.

The device described in US patent No. 6 065 272 is more particularly intended for packaging items of waste in unitary manner after they have been driven and ground 20 up individually, while also delivering a length of covering that is necessary and sufficient to constitute a unitary package.

That device is not suitable for use in applications where the waste being collected in the receptacle is 25 unsuitable for being ground up or destroyed, in particular when the waste is malodorous, or when mechanical contact with the waste while it is being collected can lead to an increase nuisance level and can constitute a major drawback.

30 OBJECTS AND SUMMARY OF THE INVENTION

The device of the invention thus enables a plastics film to be delivered inside said receptacle, enables it to be made into the form of a bag and put into place in the bottom of said receptacle, and makes this possible in 35 a manner that is automatic and without manual intervention from an operator. The plastics film in the form of a sock that is packaged in said receptacle makes

it possible to provide bags whose bottoms and tops can be closed using a seal device of the type that creates a line of sealing, in particular a line of heat-sealing, or using any other sealing or cutting method that performs
5 the same function.

The object of the present invention is also to provide a device for collecting and packaging waste, while avoiding any contact between said waste and portions of said device other than said plastics bin
10 liner bag. Another object is to avoid as much as possible any propagation of smells, or indeed any possible emanations to the outside, coming from the inside of such a bag when partially filled with waste.

Another object of the present invention is to make
15 collecting and packaging waste as efficient as possible by enabling said bags to be filled optimally.

Another object of the present invention is to provide a collection and packaging device which does not require any manual handling of the bag and which implies
20 operation that is automated to the greatest possible extent.

To do this, the present invention provides a waste collector device of the above-described type, comprising a receptacle in which a plastics bin liner bag is placed,
25 wherein the device:

- further comprises means for opening and closing said central orifice in the top portion of said receptacle through which it is possible to introduce waste into said bag, opening of said central orifice being triggered when an article such as some waste is detected over said central orifice, and said central orifice being kept closed between two occasions on which waste is introduced, said means for opening and closing said central orifice being situated above said drive
30 means; and wherein:
 - said drive means are suitable:

for adopting a disengaged position in which they define an opening in the top margin of the bag enabling waste to be introduced therein without coming into contact with the open two margin of said covering; and

for moving so as to pinch said plastics film covering coming from said compartment in the central region of said receptacle to enable said bag to be entrained, and where appropriate to be lowered down to the bottom of said receptacle.

More particularly, said drive means are constituted by first rollers situated in said receptacle beneath said storage compartment, which said storage compartment is located against the inside periphery of said receptacle in such a manner as to define a top central orifice of said receptacle through which said waste can be introduced into a said bag, and said first rollers are suitable for moving from two opposite sides of said receptacle until they pinch said plastics film covering coming from said compartment in the center region of said receptacle, and enable said bag to be driven and lowered to the bottom of said receptacle by rotating said first rollers.

Still more particularly, said first rollers are disposed in parallel, facing each other horizontally, and against or close to two opposite sides of said receptacle, and are suitable for being moved mechanically in horizontal translation in a direction perpendicular to their horizontal axes from a disengaged position enabling waste to be introduced into said bag through said central open orifice without coming into contact with the top margin of said bag, to a close-together position towards the center of said receptacle in which they pinch said covering and enable it to be driven, and where appropriate to be closed.

In accordance with the present invention, the opening into the covering is at a maximum while waste is

being introduced into the bag and the waste does not encounter any obstacle on being introduced into the bag. In addition, the waste is not subjected to any contact pressure prior to subsequent optional compacting that
5 need not take place until after the top opening of the bag has been sealed once it has been filled with waste, as explained below.

More particularly, said seal and cutter means, preferably using heat-sealing and hot-cutting, enable the
10 following steps to be performed:

a) closing the open margin of said covering in the form of a sock coming from said storage compartment so as to make the bottom of a said bag prior to lowering it to the bottom of said receptacle;

15 b) closing a bag that is completely or partially filled with waste;

c) preferably, separating a said bag after it has been sealed, by cutting said plastics film covering above the zone corresponding to the sealed closure of the top
20 margin of said full bag;

d) preferably piercing part of the top margin of a said bag above said closure zone so as to constitute a handle in the full bag that is to be removed; and

25 e) closing the bottom end of the margin of the covering coming from said compartment by heat-sealing above the zone that corresponds to said separation cut mentioned in step c), or where appropriate above said handle mentioned in step d).

Advantageously, said drive means and said seal and
30 cutter means are situated in the top portion of said receptacle and are suitable for co-operating in such a manner as to be capable of sealing said plastics film so as to close a bottom of a said bag in said steps a) and e), prior to lowering said bag to the bottom of said
35 receptacle, and where appropriate after or together with said closure of the top margin of a said full bag in step

b), and where appropriate after said cuts of steps c) and d).

In a preferred embodiment, said heat-seal and hot-cutter means are suitable for performing said steps a) to 5 e) simultaneously, and preferably comprise two heat-seal plates placed facing each other in parallel and suitable for moving from two opposite sides of said receptacle into the center region of said receptacle, pinching said plastics film covering between said two heat-seal and 10 hot-cutter plates.

More particularly, said heat-seal and hot-cutter plates are placed below said first drive rollers respectively, and are suitable for co-operating therewith so that when said two first drive rollers are rotated so 15 as to enable said bag to be placed at the bottom of said receptacle, said heat-seal and hot-cutter plates are in a spaced-apart position so as to allow said bag to pass through and be lowered between them.

More particularly, said heat-seal and hot-cutter plates are disposed respectively beneath said first drive rollers and are secured thereto, said first rollers being mounted in flexible manner so that when they are in a position pinching a said covering, it is still possible to move said heat-seal and hot-cutter plates against each 25 other in the center of said receptacle in order to perform said heat-sealing and said hot-cutting of said covering pinched between said two plates.

According to another advantageous characteristic of the present invention, the device includes compactor 30 means suitable for applying pressure against the film constituting the bag once it is partially or completely filled with waste, said pressure being applied to the outside of the bag.

These compactor means come into action after the 35 waste has been introduced into the bag and immediately prior to the bag opening being sealed, and they are thus

dissociated from or independent of the means for driving the covering.

The compactor device makes it possible to reduce the volume of the waste inside the bag, and thus to reduce the consumption of bag material and to increase the length of time a bag can be used, thereby reducing the number of bag changes. These compactor means are optional, and they could even be actuated manually, but preferably they are triggered automatically.

More particularly, said compactor means comprise pivotally-mounted compactor bars situated beneath said heat-seal and hot-cutter means and suitable for pivoting from a rest position in which said bars are disposed against respective opposite sides of said receptacle to a tilted position obtained by pivoting about respective pivot axes situated at their bottom ends which are secured against said respective opposite sides of said receptacle until the top ends of said bars reach the center region of said receptacle.

Preferably, said compactor means is actuated automatically using a photoelectric cell or a sensor, as soon as a said bag is more than half full, and preferably after each new introduction of waste into said bag, and then when said bag is completely full, said compactor means are maintained in the compacting position until after said heat-sealing and/or said hot-cutting for closing said full bag and, where appropriate, for separating it.

Advantageously, said compactor arms include flexible or semi-rigid strips tensioned across rigid frames so that when said compactor strips encounter said bag filled with said incompressible waste, said compactor strips deform, thereby avoiding tearing said plastics bag, and said pivoting of said compactor strip is interrupted on encountering resistance corresponding to a predetermined compacting pressure.

According to another advantageous characteristic of the present invention, the device includes means for opening and closing a central orifice in the top portion of said receptacle through which waste is introduced into 5 said bag, said opening and closing means being controlled automatically by means of a photoelectric cell or a sensor so as to keep said receptacle closed between two occasions on which waste is introduced, and so as to cause said central orifice to open when an article such 10 as waste is presented over the location corresponding to said central orifice:

Also advantageously, said opening and closing means comprising a moving strip wound between two second rollers disposed respectively against two opposite sides 15 of said receptacle over said storage compartment, with movement of said strip being obtained by rotating said second rollers, said moving strip including an opening, preferably of substantially the same shape as said central orifice, so that when said opening coincides with 20 said central orifice said receptacle is in an open position allowing waste to be introduced, and when a solid portion of said strip completely covers said top central orifice, said receptacle is in a closed position, thereby confining said waste inside said receptacle.

According to another advantageous characteristic of the present invention, said bag is put into place at the bottom of said receptacle inside a box, said box being secured to at least a bottom portion of one of the sides 30 of said receptacle, and said box resting on slider means enabling a said bag to be removed by pulling said bottom portion of the side of the receptacle that is secured to said box.

According to another advantageous characteristic of the invention, the device of the invention is fitted with 35 electronic means enabling the various steps listed below to be controlled and synchronized as a function of

information received from said photoelectric cells or sensors:

The present invention also provides a method of collecting waste using a device of the invention.

5 More particularly, the method of the invention for collecting waste is performed by implementing the following steps in succession:

10 1) sealing and cutting said covering to form the bottom of a said bag using said seal and cutter means (10_1 , 10_2);

2) driving said bag inside said receptacle, preferably to the bottom of said receptacle, using said drive means (6_1 , 6_2);

15 3) putting said drive means in a disengagement position in which they define an opening at the top margin of the bag, enabling waste to be introduced therein;

20 4) opening said central orifice (1_2) using said closing and opening means (17 , 18_1 , 18_2) whenever waste is detected above said central orifice (1_2);

5) inserting said waste through said open central orifice (1_2), said waste being collected in the bottom of a said bag;

25 6) closing said central orifice (1_2) using said means (17 , 18_1 , 18_2) for closing and opening central orifice (1_2) immediately after said waste has been introduced through said central orifice (1_2) opened in step 2);

7) where appropriate, compacting said bag using said compactor means (14_1 , 14_2);

30 8) sealing and cutting the top margin of said bag, once full of waste, using said seal and cutter means (10_1 , 10_2); and

9) where appropriate, removing said bag from said receptacle.

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BRIEF DESCRIPTION OF THE DRAWINGS

Other characteristics and advantages of the present invention appear in the light of the following detailed

description made with reference to Figures 1 to 8, in which:

• Figure 1 is a perspective view of a waste collector device of the invention;

5 • Figure 2 is a mid-section view of a collector device of the invention showing a bag that is in place and half-filled with waste, the compactor arms being disengaged in a rest position;

10 • Figure 3 is a mid-section view of a collector device of the invention, the bag being two-thirds full and the compactor arms being put into compacting operation;

15 • Figure 4 is a mid-section view of a collector device of the invention in which the bag is full, with the compactor arms being in the compacting position and the heat-seal plates being in the heat-sealing position;

• Figures 5 and 6 show respective plates for heat-sealing and hot-cutting;

20 • Figure 7 shows the bottom portion of the device while a full bag is being removed, with the top portion of the device being shown with its lid raised; and

• Figure 8 is a view of means for opening and closing the central orifice in the top portion of said receptacle, through which waste is introduced.

25 MORE DETAILED DESCRIPTION

The waste collector device comprises a receptacle 1 in which a plastics bin liner bag 2 is put into place.

The device further comprises:

30 • drive means 6₁, 6₂ for driving a covering 2₁ for making a plastics bag 2 contained in a compartment 4 situated in the top portion of said receptacle 1, and said drive means 6₁, 6₂ serving to deliver said bag from said storage compartment 4 to a bottom 1₁ of said receptacle 1; and

35 • seal and cutter means 10₁, 10₂, preferably operating by heat-sealing and hot-cutting, for sealing said covering leaving said compartment 4, and then

closing a said bag 2 once it has been filled with waste 20 and separating it from the remainder of said covering.

The waste collector device of the invention includes compactor means 14₁, 14₂ for compacting the bag containing waste, and means 17, 18₁-18₄ for closing and opening a central orifice through waste is introduced via the top portion of the collector device.

More precisely, the waste collector device of the present invention comprises a rigid receptacle 1 in the form of a rectangular parallelepiped having a plastics covering 2 placed therein for the purpose of making a bag.

The plastics bag 2 rests on the bottom 1₁ of the receptacle 1 in a bottom box 3 which serves to hold it and enables waste 20 to be contained in the event of the bag 2 being torn, and finally serves to remove the bag 2 in a manner explained below.

In its top portion, the receptacle 1 has a peripheral storage compartment 4 resting on a flat peripheral frame 5 constituting a support, said storage compartment 4 serving to store a plastics film 2₁, in particular a polyethylene film, serving to make bags 2. The film 2₁ is stored in the form of a sock folded in said peripheral compartment 4, which compartment has a peripheral slot (not shown) enabling said film to be delivered and output in the form of a sock. It will be understood that the peripheral compartment 4 defines a central orifice 1₂ in the top portion of the receptacle 1 through which waste 20 is introduced into the bag 2 when it has been put into place down to the bottom 1₁ of the receptacle 1.

The receptacle 1 is fitted on the inside with means for putting the bag into place by unwinding the plastics film 2₁ from its compartment 4, said means being constituted by two of said first drive rollers 6₁, 6₂, which are disposed and operate as follows.

Said first rollers 6₁, 6₂ are disposed facing each other along two opposite sides 1₃, 1₄ of said receptacle 1, i.e. they are parallel to each other. They can revolve about their own longitudinal axes which, thus 5 constitute axes of rotation. They are suitable for being moved in translation in a transverse direction, i.e. in a direction perpendicular to their axes, i.e. along the direction of the other two lateral sides of said receptacle 1.

10 Said first rollers 6₁, 6₂ for driving the bag are mounted between two lateral support plates 7₁, 7₂, themselves mounted under said support frame 5. Said lateral plates 7₁, 7₂ are placed against two opposite sides 1₃, 1₄ of said receptacle and are interconnected by 15 transverse rods 8₁, 8₂ and 16₁, 16₂ disposed along the other two opposite sides 15, 16 of the receptacle so as to leave open said top central orifice 1₂ defined by said compartment 4. These guide rods are constituted by wormscrews along which carriages can be moved. Two 20 carriages 9₁, 9₂ move along each of the first guide rods 8₁, 8₂, each carriage being secured to an end of a respective one of said first drive rollers 6₁, 6₂, thereby enabling said first rollers 6₁, 6₂ to be moved from the sides 1₃, 1₄ of the receptacle 1, towards the center of 25 the receptacle in such a manner as to pinch the plastics film 4 constituting said bag. At least one of said drive rollers 6₁ is fitted with a first motor 6₃ fastened to one of its ends and enabling it to revolve. Said motor-driven first roller 6₁ causes the second drive roller 6₂, 30 to rotate by means of two cog wheels secured to the shafts and at each end of each of said drive rollers 6₁, 6₂, thereby constituting gearing when said two rollers 6₁, 6₂ are in contact. The shafts of the first rollers 6₁, 6₂ are mounted on the two lateral guide rods 8₁, 8₂ at their 35 ends, and on the first carriages 9₁, 9₂ via return springs contained in the part 6₄ which serves to vary the spacing between said first rollers 6₁, 6₂ relative to each other

as a function of the thickness of the plastics film constituting the bag 2.

Said first rollers enable the sheath constituting the covering to be unwound, and thus lowered towards the bottom of the collector, but if they are caused to turn in the opposite direction, they can also cause the sheath to be raised, in order to save on sheath material if it is desired to optimize the length of sheath that is used relative to the waste it contains, i.e. so as to seal the sheath immediately about the waste. When the first rollers are spaced apart, they define a large bag opening of square section making it easier for waste to drop into the bag. The flexible mounting of said drive rollers 6₁, 6₂ also makes it possible to perform heat-sealing and hot-cutting of the plastics film for the purpose of sealing the end margin of the film forming a covering and thus forming the bottom of the bag before it is put into place, as explained below.

The film 2₁ initially leaves its compartment 4 in the form of a flexible open tubular covering. Said receptacle 1 is also fitted with heat-seal and hot-cutter means 10₁, 10₂ which enable the case to be sealed so as to constitute the bottom of a bag prior to being unwound down to the bottom of the receptacle 1. The heat-seal and hot-cutter means 10₁, 10₂ thus comprise two heat-seal and hot-cutter plates 10₁, 10₂. These two heat-seal and hot-cutter plates 10₁, 10₂ are mounted beneath said first drive rollers 6₁, 6₂ and are secured thereto and to said first carriages 9₁, 9₂. Said heat-seal and hot-cutter plates 10₁, 10₂ are thus moved by the same carriages 9₁, 9₂ in the transverse direction from the opposite sides 1₃, 1₄ of the receptacle 1 towards the center of the receptacle by moving along the two transverse guide rods 8₁, 8₂ constituted by wormscrews. Said heat-seal and hot-cutter plates 10₁, 10₂ are nevertheless offset a little back by about 1 centimeter (cm) relative to said drive rollers 6₁, 6₂ so that when said first drive rollers 6₁, 6₂ are in

contact against each other, said heat-seal and hot-cutter plates 10₁, 10₂ leave an empty space between each other, enabling the bag 2 to be unwound and to pass between said plates 10₁, 10₂ until it reaches the bottom 1₁ of the
5 receptacle 1. Since said first drive rollers 6₁, 6₂ are mounted in flexible manner on return springs 6₅, it is still possible to move said plates 10₁, 10₂ against said each other so as to perform heat-sealing and hot-cutting by continuing to move the carriages 9₁, 9₂ towards the
10 center, with this being made possible by the way in which said drive rollers are mounted to allow them to move laterally.

The plastics film 2 is heat-sealed and hot-cut under the following circumstances:

- 15 1) Initially when the device is first used, i.e. the first time a bag is put into place. Before unwinding a full length of covering film to be installed at the bottom of the receptacle 1, the covering is closed by heat-sealing to constitute the bottom of the bag.
- 20 2) Thereafter, once the bag is full, the heat-seal and hot-cutter plates serve:
 - a) to heat-seal the top opening of the bag, thereby closing the bag;
 - b) to separate the bag closed in this way from the film situated above it which was previously in continuity with the bag prior to closure, separation being performed by hot-cutting;
 - c) to heat-seal the open covering as created in this way so as to make the bottom of the following bag that is to be put into place, i.e. lowered to the bottom 1₁ of the receptacle 1, after the preceding full bag 2 has been removed; and
 - d) to create a slot in the top portion of the margin of the full bag and situated above the heat-seal line, the slot being made by hot-cutting.
- 25
- 30
- 35

Above-mentioned operations a) to d) are performed simultaneously, given the structure of the heat-seal and hot-cutter plates 10₁ and 10₂, as described below.

The first heat-seal and hot-cutter plate 10₁ has two
5 longitudinal grooves running along its bottom and top
sides, which grooves contain metal-clad resistance
elements 11₁ and 11₂ serving to heat-seal the bottom of
the top bag and the top margin of the bottom bag.

Beneath the top element 11₁, there is placed a first
10 heater wire 12₁ fixed to said first heat-seal plate 10₁,
and tensioned between two fastening holes 13₁, 13₂. This
first heater wire 12₁ co-operates with the second heat-
seal plate 10₁ by being received in a first slot 10₄ of
said second heat-seal and hot-cutter plate 10₂ when said
15 heat-seal and hot-cutter plates 10₁ and 10₂ are pressed
against each other so as to make contact. This cuts the
film and separates the two bags by hot-cutting with the
wire passing through the film 2 and through said second
plate 10₂ so as to be received in the first slot 10₄ when
20 said two plates 10₁ and 10₂ are put into contact. A
second heater wire 12₂ is placed beneath the first heater
wire 12₁, extending over a shorter length than said first
heater wire 12₁. This second heater wire 12₂ co-operates
with a second slot 10₅ of said second heat-seal plate 10₂.
25 Said second slot 10₅ is thus placed in register with the
second heater wire 12₂ and operates in the same manner as
the assembly comprised by the first heater wire 12₁ and
the first slot 10₄. Said second heater wire 12₂ co-
operates with said second slot 10₅ to form a handle 2₁ in
30 the top margin of the full bag 2 by hot-cutting, which
bag is closed simultaneously by heat-sealing using said
bottom second element 11₂.

Naturally, the sealing and cutting of bags could be
performed by methods other than heat-sealing and hot-
35 cutting without thereby going beyond the ambit of the
invention.

The waste collector device of the invention further comprises compactor means 14_1 , 14_2 and 15_1 , 15_2 , 16_1 , 16_2 , 16_3 , 16_4 for compacting the bag 1 once it has been filled with waste 20, completely or in part.

5 The compactor means comprise compactor arms 14_1 , 14_2 pivotally mounted against the inside walls of the opposite sides 1_3 , 1_4 of the receptacle 1. These compactor arms 14_1 , 14_2 pivot about their pivot axes 14_3 , 14_4 situated at the bottom ends of said compactor arms
10 14_1 , 14_2 . Said bottom ends are secured against said opposite sides 1_3 , 1_4 respectively of said receptacle 1, so that by pivoting their top ends can tilt and move towards each other, pressing against the outsides of the walls of the bag 2 in its bottom portion. This compacts
15 the waste 20 contained in the bag 2 while avoiding any contact with said waste.

In the rest position, prior to being put into operation, said compactor arms 14_1 , 14_2 are disposed substantially vertically against the sides of the
20 receptacle 1, thus releasing the bag opening and enabling waste 20 to be introduced into said bags.

Said compactor arms 14_1 , 14_2 are pivoted in application by the following mechanism. The top ends of said compactor arms 14_1 , 14_2 can be moved towards the
25 center of the receptacle 1 since they are connected via link arms 15_1 , 15_2 in the form of deformable parallelograms to second transverse guide rods 16_1 , 16_2 disposed transversely and serving to join together said lateral support plates 7_1 , 7_2 . It will be understood that
30 said second transverse rods 16_1 , 16_2 are situated beneath said first transverse rods 8_1 , 8_2 and beneath said heat-seal and hot-cutter plates 10_1 , 10_2 . Said second transverse rods 16_1 , 16_2 are constituted by wormscrews supporting a second motor 16_3 , enabling two carriages 16_4 ,
35 16_5 to be moved along each of the transverse rods 16_1 , 16_2 , each carriage being secured to one end of said link arms 15_1 , 15_2 . The pivoting of said compactor arms 14_1 ,

14₂ takes place when said second carriages 16₄, 16₅, and thus said link arms 15₁, 15₂, are moved towards the center of the receptacle. The stationary bottom ends 14₃, 14₄ of said compactor arms 14₁, 14₂ are situated about halfway up
5 the height of the bag 2.

When the bag 2 is two-thirds full, a first compacting operation is performed (Figure 3). Thereafter, if so desired, a new compacting operation is performed after each introduction of new waste into the
10 inside of the bin liner bag 2. Finally, when the bin liner bag 2 is considered as being full, final compacting performed (Figure 4). During final compacting, the compactor arms 14₁, 14₂ remain tilted in the compacting position so as to allow the bag to be closed by heat-
15 sealing and to be hot-cut so as to be separated. Said compactor arms then return to the substantially vertical rest position against said opposite sides 1₃, 1₄ of the receptacle 1 after heat-sealing and hot-cutting have been completed.

20 In order to avoid tearing the bag during compacting, the pivoting compactor arms are constituted by rigid frames, each of said frames supporting a flexible or semi-rigid strip (not shown) that is tensioned across the inside 14₅ of said frame. This embodiment enables
25 compacting pressure to be exerted by said flexible or semi-rigid strip, thereby deforming the strip while pressure is being exerted and thus avoiding tearing the bag 2 if there is any incompressible waste 20 therein. In addition, the motor 16₃, driving pivoting of the
30 compactor arms 14₁, 14₂, is fitted with a device enabling it to be declutched in the event of pressure exceeding a certain given threshold, where said pressure threshold is adjustable depending on the nature of the waste to be collected.

35 The compactor arms 14₁, 14₂, may naturally also be pivoted by a mechanism other than the systems of links

arms 15₁, 15₂ guided by said second transverse rod constituted by wormscrews 16₁, 16₂.

The waste collector device of the invention is also fitted in its top portion with a sensor (not shown), in particular an ultrasound sensor enabling the level to which the bin liner bag has been filled to be sensed using a known technique for measuring distance, for example. Thus, when the distance between the waste 20 and the sensor has a value that corresponds to the bag being two-thirds full, said compactor arms 14₁, 14₂ are automatically put into action. Similarly, after each introduction of waste 20 leading to a change in the height of the top of the waste, a new compacting operation is implemented automatically, if so desired.

Finally, when the sensor detects that the bin liner bag 2 is completely full, the compactor arms 14₁, 14₂ are maintained in the tilted compacting position, and the heat-seal and hot-cutter plates 10₁, 10₂ are put into action by being moved automatically so as to come into contact against each other as mentioned above.

Nevertheless, it should be observed that it is possible for activation of the compactor arms 14₁, 14₂ to be optional. Thus, in certain hospital applications waste should not be compacted. Under such circumstances, it suffices in the collector device of the invention to close the bag by heat-sealing once it is full, but without performing compacting.

After a full bag has been heat-sealed and closed, a new bag 2 as created in this way is unwound and put into place, likewise in automatic manner, once the full bag has been removed to the outside of the receptacle 1, as described below.

A full bin liner bag 2 is removed 3₂ as follows. The bottom box 3 is slidably mounted on supporting slideways so that it can be slide out from the front of the receptacle 1 like a drawer 3₁.

If the bag is removed before it has been filled completely, opening the drawer 3₁ causes the motors for actuating the various elements of the collector device of the invention, such as compactor arms 14₁, 14₂, to be disconnected automatically. This removal 3₂ is performed manually, but it could also be motor-driven and under automatic control.

For reasons of hygiene, and in accordance with an advantageous characteristic of the invention, the waste 10 collector device is fitted in its top portion with a device for automatically controlling opening and closing of the top portion of the receptacle 1, i.e. access to the opening of the bag 2 that is in place inside the receptacle 1. Between two occasions on which waste 20 is 15 introduced into the collector device of the present invention, the top portion of the receptacle is closed, thus confining the waste in the receptacle, even if the bag 2 is not yet full and is therefore still open.

A device for opening and closing the top portion of 20 the receptacle 1 is constituted by a moving strip 17 which moves between two second rollers 18₁, 18₂ disposed respectively against two opposite sides of the receptacle 1 and above said compartment 4 for storing the folded film 2₁. The moving strip 17 includes an opening of the same shape as the central opening 1₂ defined by the 25 peripheral compartment 4 and said peripheral support frame 5 on which it rests. When the moving strip 17 moves between said second rollers 18₁, 18₂, said opening of said moving strip 17 coincides with said central opening 1₂ of the top portion of the receptacle 1, and said receptacle 1 is thus open and it is possible to introduce waste 20 into the bag 2. When the moving strip 17 is moved so that a solid portion of the strip 17 overlies said central opening of the receptacle 1, then 30 the receptacle is closed and it is no longer possible to introduce waste 20 into the bag 2.

A third motor 18₄ rotates said second roller 18₁, thereby also rotating said second roller 18₂ by means of a transverse connecting belt 18₅ interconnecting the shafts of said second rollers 18₁, 18₂ via end pulley wheels 18₃.

5 Putting said motor 17₁ into operation causes the two rollers 18₁, 18₂ to rotate, and thereby causes the strip 17 to move until the opening of the receptacle 1 is detected by a photoelectric cell or sensor (not shown) which detects the presence either of waste 20 being
10 brought over the receptacle 1, or the presence of any other subject such as the hand of an operator, likewise presented over the closed opening of the receptacle 1. Thereafter closing of the receptacle 1 is likewise triggered automatically after it has been left open for a
15 few seconds.

Without going beyond the ambit of the present invention, it is possible to provide a top system 17 for opening and closing the receptacle 1 that is different from the above, in particular that includes a tilting closure lid. Nevertheless, the system proposed in the invention with a horizontal moving strip presents the advantage of minimizing the amount of air that is moved, and thus of minimizing the exchange of air between the inside and the outside of the waste-filled bag. In a
20 hospital application, this horizontal opening system avoids potential contamination problems.
25

Said second rollers 18₁, 18₂, which enable said moving strip to be moved for opening and closing the top of the receptacle 1, are housed in a hollow peripheral lid 19 situated above said peripheral compartment 4 and giving access thereto in order to install a new folded film 2₁ once the old film has been used up. One of the sides of said hollow lid 19 is mounted on a hinge 19₁ so as to enable it to be raised 19₂ by being tilted.

30 An important advantage of the invention is that all of the means used, whether the means for unwinding the bag, the means for heat-sealing, or the means for

compacting, all act from the outside of the plastics film covering constituting the walls of the bag 2, and thus without coming into contact with said waste 20; this also guarantees hygiene. The waste thus always falls directly 5 into the bag, without ever coming into contact with the various means implemented.

The collector device of the invention includes an electronics card (22) for controlling the various motors that serve to rotate said first rollers 6₁, 6₂, said 10 second rollers 18₁, 18₂, or to move said first rollers 6₁, 6₂ and said heat-seal plates 10₁, 10₂, and/or to pivot said compactor arms 14₁, 14₂, as a function of information received from said sensor.

Furthermore, the electronics card also controls 15 disconnection of the various heat-seal means and compactor means, etc., during optional early removal 3₂ of a bag from said receptacle 1.

The electronics card thus manages both the safety and the operating functions of the waste collector device 20 of the invention.

It should be observed that the sensor for monitoring opening of the receptacle 1 also serves to ensure that said opening is not obstructed by poorly-introduced waste.

Finally, it should be observed that the device can 25 be programmed so as to make unitary coverings for each introduction of waste, whenever so required, i.e. without waiting for the bag to be completely filled prior to closing the bag by heat-sealing and enabling it to be removed. More generally, bulk collection is performed 30 with full bags being removed.

A waste collector and packaging device of the invention can advantageously used as a waste bin, optionally integrated in a kitchen or a bathroom, in a 35 household application, or indeed in a collective application such as in a hospital or in a canteen. Finally, the collector and packaging device of the

invention can be adapted to contain a plurality of receptacles side by side or a plurality of bags 2 side by side in the same receptacle 1 so as to enable waste to be sorted.

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